V TERRESTRIAL ECOSYSTEM

V.1 VEGETATION

What is the current abundance and composition of the plant communities present in the analysis area?

The analysis area lies within the Mixed-Evergreen (*Pseudostuga*-Sclerophyll) forest zone, also referred to as Douglas-fir/hardwood forests. The landscape is generally forested with an occasional meadow. The trees comprising these forested stands are predominantly Douglas-fir and tanoak (*Lithocarpus densiflorus*), both of which are judged to be climax species (Franklin and Dyrness 1973). Other species, such as knobcone pine, madrone, myrtle, and bigleaf maple are present. Good discussion on this vegetation community are found in Franklin and Dryness (1973) and Whittaker (1960).

Douglas-fir/hardwood

The Mixed-Evergreen zone is "one of the most diverse and complex forest regions of western North America" (Agee 1993). Over 85% of the analysis area contains varying stages of this Douglas-fir/hardwood plant community. In mature stands, Douglas-fir occupies the dominant position in the canopy and supplies from 40 to 60 % of the overall cover (Atzet et al. 1996). The lower canopy position is occupied predominately by tanoak, supplying most of the remainder of the cover. Madrone and chinquapin are also present in the lower canopy, but generally occupy less than 10 % of the cover. Myrtle, bigleaf maple, and red alder are more common closer to riparian areas (refer to Section IV.4-Riparian Habitat).

Plant Associations

This community is composed of several plant associations as described in the *Field Guide to Plant Associations of Southwestern Oregon* (USDA Forest Service, 1996b). According to visual observations and information from the Guide, the predominant plant association is;

- LIDE3/VAOV2-RHMA3-GASH (page LIDE3-36) TANOAK/EVERGREEN HUCKLEBERRY-PACIFIC RHODODENDRON-SALAL

  This association is usually indicative of dry, less hospital sites. Differences in moisture regime within this association can be determined by the presence of sword fern (more moist) or salal and beargrass (more dry) (USDA Forest Service, 1984).

In addition, one small area west of Morton Butte contains canyon live oak and can be classified as;

- LIDE3/PSME-QUCH/BENE2 (page LIDE3-22) TANOAK-DOUGLAS-FIR-CANYON LIVE OAK/DWARF OREGON GRAPE

  This site contains shallow soils with exposed rock outcrops.

Other associations may be present, but are expected to be a minor percentage.

Overstory Species Composition

According to BLM's Forest Operations Inventory (FOI), Douglas-fir dominated stands presently

occupy 45 % of BLM lands in the analysis area (Table V-1 and Figure V-1). Prior to 1960, this percentage was probably closer to 60 %, as the acres classified as 'timber sale units' tended to be concentrated in conifer dominated stands. While FOI information for some stands may be inaccurate, it does offer the best available picture of forest condition. For example, this information commonly identifies stands with a mixed conifer-hardwood stand structure and tanoak; therefore, the data should be used a only as a general point of reference.

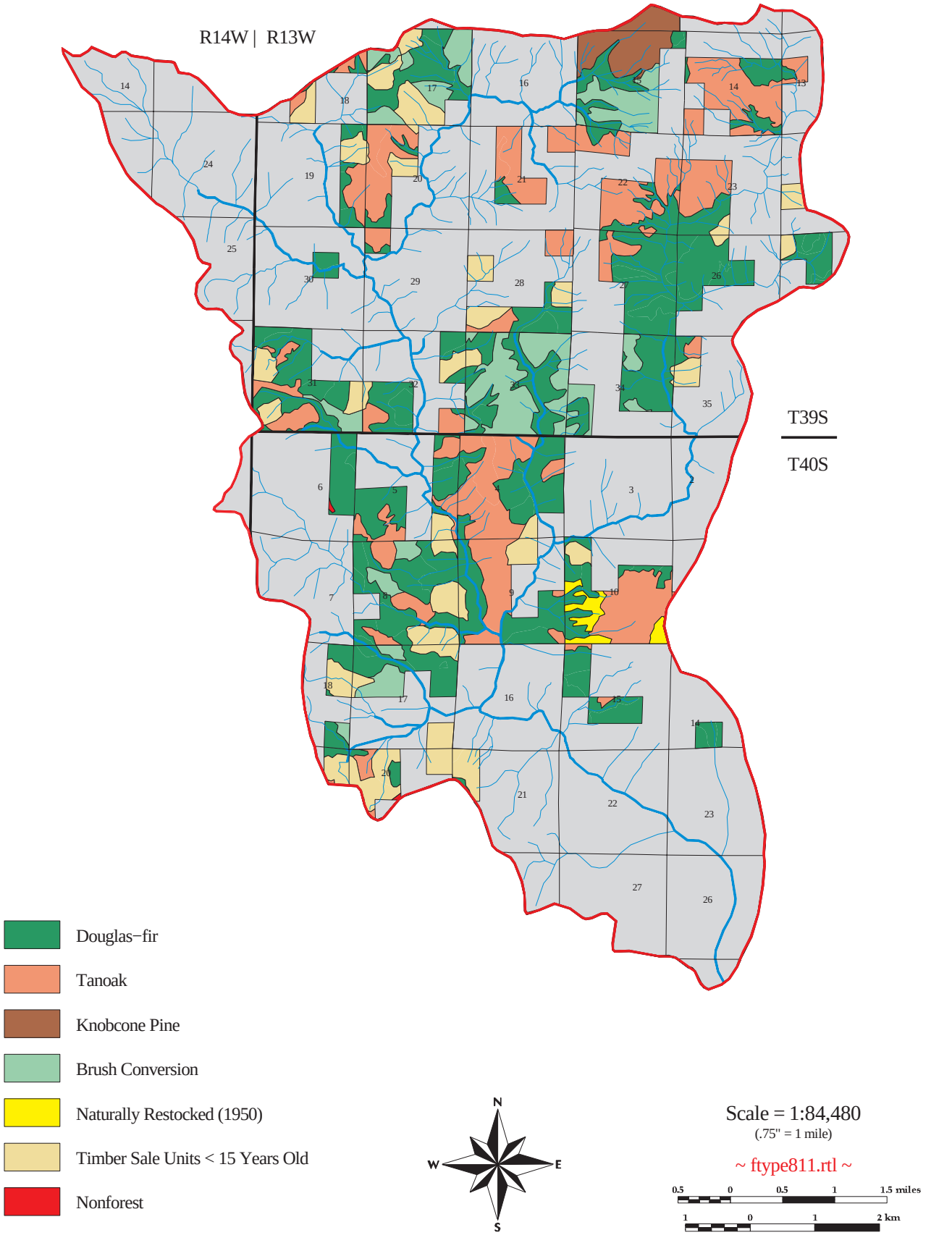
Table V-1 Dominant Cover Type Distribution on BLM Lands

Dominant Cover Species	Acres	% BLM lands
Douglas-fir	4,206	45 %
Tanoak	2,449	26 %
Timber sale units (30 years or less) - planted Douglas-fir	1,261	14 %
'Brush Conversion' (generally unmerchantable tanoak or manzanita/young fir/knobcone	997	11%
Knobcone Pine	256	3 %
Non-forest (meadows)	4	<1 %
Total	9,262	100 %

The Douglas-fir stands tend to be located in the south and west portions of the analysis area. Elsewhere it is located lower on the hillslopes adjacent to the stream system. This may be due to several factors, including soil type, climate, and fire. The soil types (117F, 118F, and 165E) may provide better conditions for growth, but preliminary data is inconclusive. The proximity of the analysis area to the coastal fog belt may provide additional moisture that could make a difference over large periods of time. Visual observations reveal that coastal fog occasionally creeps up the lower part of the North Fork Chetco River corridor and along the west boundary of the analysis area. This increase on moisture may influence vegetation. The other factor to be considered is that the northeast portion of the analysis area has had repeated fires, which have removed the Douglas-fir component, except for riparian areas (refer to VI.4-Riparian Habitat). Anecdotal evidence suggests that this area was largely covered with Douglas-fir prior to the fires in the early 1900's.

Early timber sales were concentrated in Douglas-fir dominated stands. Review of information from ten timber sales confirms the presence of a two-species stand composition. The percentage of Douglas-fir stems ranges from 33 to 88%, with the remainder being tanoak. Also, a comparison of tree diameter confirms a two-storied stand structure. The average diameter of Douglas-fir ranges from 28" to 38" d.b.h., while that of tanoak was from 12" to 16" d.b.h.

Figure V−1 Dominant Overstory Timber Type on BLM lands



Review of cruise information from a 1991 sale [1] reveal trace numbers of grand fir, western hemlock, and Port-Orford-cedar trees. This sale was located along the extreme west edge of the analysis area and these species were probably found in an understory position. Review of riparian vegetation surveys conducted along mainstem streams further to the east (refer to Section IV.4-Riparian Habitat) do not reveal the presence of these minor conifer species.

FOI identifies 26% of BLM lands as having a dominate tanoak cover type. Most of these are young tanoak stands that contain a Douglas-fir component. While tanoak has a higher tolerance for dryer, harsher sites than Douglas-fir, these stands are primarily the result of recent human-caused fire and represent an early seral stage in transition. Tanoak is the predominant regenerated tree species due to its ability to regenerate from root sprouts. Nonetheless, Douglas-fir can frequently be found seeding in on areas of exposed soil, such as road cutbanks/fill slopes and landslide areas. Eventually, the Douglas-fir will surpass the tanoak and become a dominant overstory species. However, due to the low initial stocking of mature Douglas-fir in these stands, the Douglas-fir will probably develop a lower percent cover than Douglas-fir stands elsewhere in the analysis area. Some of the area classified as brush conversion include young tanoak and Douglas-fir, or young fir/manzanita/knobcone pine stands. Baring future disturbance, these should develop on a similar trajectory.

Hardwood Stands

Tanoak is rarely found without some conifer component (McDonald and Huber 1995). A majority of the tanoak dominated stands observed in the analysis area are primarily the result of human-caused fire or logging during the 1950's-1970's. The high-grade logging practices during this time removed the residual Douglas-fir component from mixed stands. Consequently, these stands were then converted to those with a high tanoak component (Adams, et al. 1992). It is though that naturally occurring tanoak hardwood stands would comprise only a small component of the landscape. Pure or nearly pure tanoak stands are initially created by high intensity fires (Agee 1993) and are representative of an early successional stage (Neimiec et at. 1995).

Some pure or nearly pure stands of red alder are located in the riparian areas. These stands have developed in response to disturbance activities, logging and road construction (refer to Section IV.1-Aquatic Habitat).

Knobcone Pine

Knobcone pine (*Pinus attenuata*) is generally found in pure ,even-aged stands, the largest of which is concentrated in the Bosley Butte portion of the analysis area, and occupy at least 256 acres (3 %) of BLM lands (Figure V-1). This acreage does not reflect the smaller pockets distributed throughout the rest of the area and could be as much as 50% higher. In addition, no estimate of the acreage on private lands has been determined, but is expected to be small based on visual estimates. Manzanita (*Arctostaphylos* spp.) forms a dense shrub layer in association with the pine and

[1] Timber sale cruise data prior to this time often did not contain trees less than 12" d.b.h. or if the total volume of the minor tree species was less than 10 MBF for the sale. Therefore, minor conifer tree species might have been present, but not recorded.

Douglas-fir dominated stands are often adjacent.

Stands of knobcone pine appear to be strongly associated with the Jurassic w/volcanics geologic formation (Jv) (Figure III-1). This underlying geology is composed of pillow basalt and breccia of the Dothan formation and may be moisture limited. Also, these areas are more resistant to weathering and are generally located on the higher elevations or high points in respect to the neighboring terrain. Wildfires tend to burn hotter in these higher areas which results in an environment more suited to the establishment of knobcone pine. Knobcone pine has serotinous cones which release their seeds following high intensity fires (Harlow and Harrar 1969). These repeated high intensity fires remove other conifer or hardwood tree species and prevent their reestablishment, consequently, species such as knobcone or manzanita occupy the site (Agee 1993).

Bryophytes, Lichens, and Fungi

Vegetative diversity not only includes the number of species (richness), but also the genetic diversity within species, community, and ecological process diversity. This also includes vascular plants, non-vascular plants (bryophytes - mosses, liverworts and hornworts), lichens, and fungi. No data is available to make an accurate estimate of the diversity and biomass of bryophytes, lichens and fungi within the analysis area. (refer to Section VI-Riparian Reserve Evaluation, for a partial list of species which may occur in the analysis area).

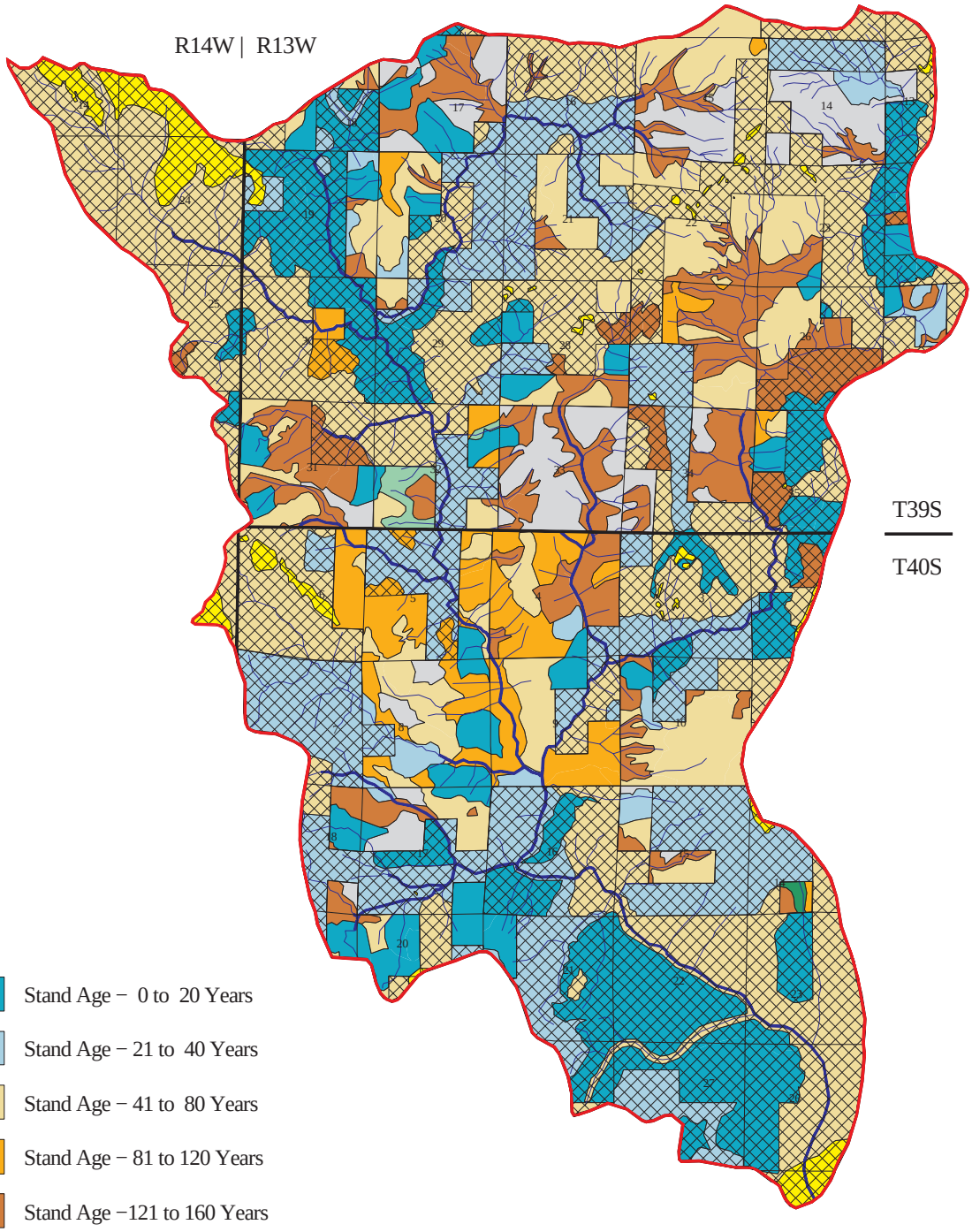
Bryophytes play important roles in the maintenance of ecosystem stability including regulating water relations and nutrient cycling. They also provide food and habitat for many invertebrates and vertebrates, maintenance of forest stream ecosystems, help increase soil stability, and providing a seed bed for many plant species.

Fungi profoundly affect nearly all ecological processes and events, either directly or indirectly, which occur in coniferous forest ecosystems (Trappe and Luoma 1992). Ecological roles that fungi have include, mycorrhizal associations with nearly all woody vegetation which aids growth and in some cases protection from diseases, nutrient cycling (saprophytic fungi), soil aggregation, food webs, and diseases, such as *Phellinus*, which helps create forest gaps thus increasing forest complexity.

What is the current age distribution forested stands?

The age distribution in the analysis area can best be characterized by young stands (<= 40 years of age) covering 38 % and 'pole-timber' stands (41-80 years) covering 43 % (Table V-2). Old growth forests (> 200 years of age) occur on only 1%. The relatively high acreage of stands in the 41- 80 year age-class reflects the large percentage of the area that has burned this century, as well as high levels of harvest on private land in the 1950's. Age distribution on BLM lands is roughly similar with the largest age groupings being the pole timber stands (43 %) followed by mature timber (25 %). For use in habitat evaluation, reclassification of this age class data by seral class may be of better use (refer to Section V.2-Terrestrial Habitat). The location of different age classes is shown in Figure V-2.

Figure V−2 Timber Age Class Distribution



Cursory aerial photo interpretation suggests that 15 % of private land has not yet been harvested, however, of this only 3 % could be classified as late-successional, conifer forests. Therefore, old growth forest habitat is virtually absent from private land. Private land is primarily managed for timber production or livestock grazing and will likely never provide significant amounts of late-successional or old growth forests.

Table V- 2 Acreages of Various Age Classes

	BLM Ownership (9,262 ac)		Private Ownership (16,300 ac)		TOTAL (25,562 ac)
Forest Age Class	Acres	% of BLM	Acres	% of PVT	% of Total
meadows	4	< 1 %	567	4 %	2 %
0 - 20	1277	14 %	3349	21 %	18%
21 - 40	399	4 %	4641	29 %	20 %
41 - 80	4002	43 %	7076	43 %	43 %
81 - 120	1180	13 %	114	< 1 %	5 %
121 - 160	2297	25 %	523	3 %	11 %
161 - 200	85	< 1 %	-	-	< 1 %
200 +	18	< 1 %	-	-	< 1 %
Totals	9,262	36 %	16,300	64 %	

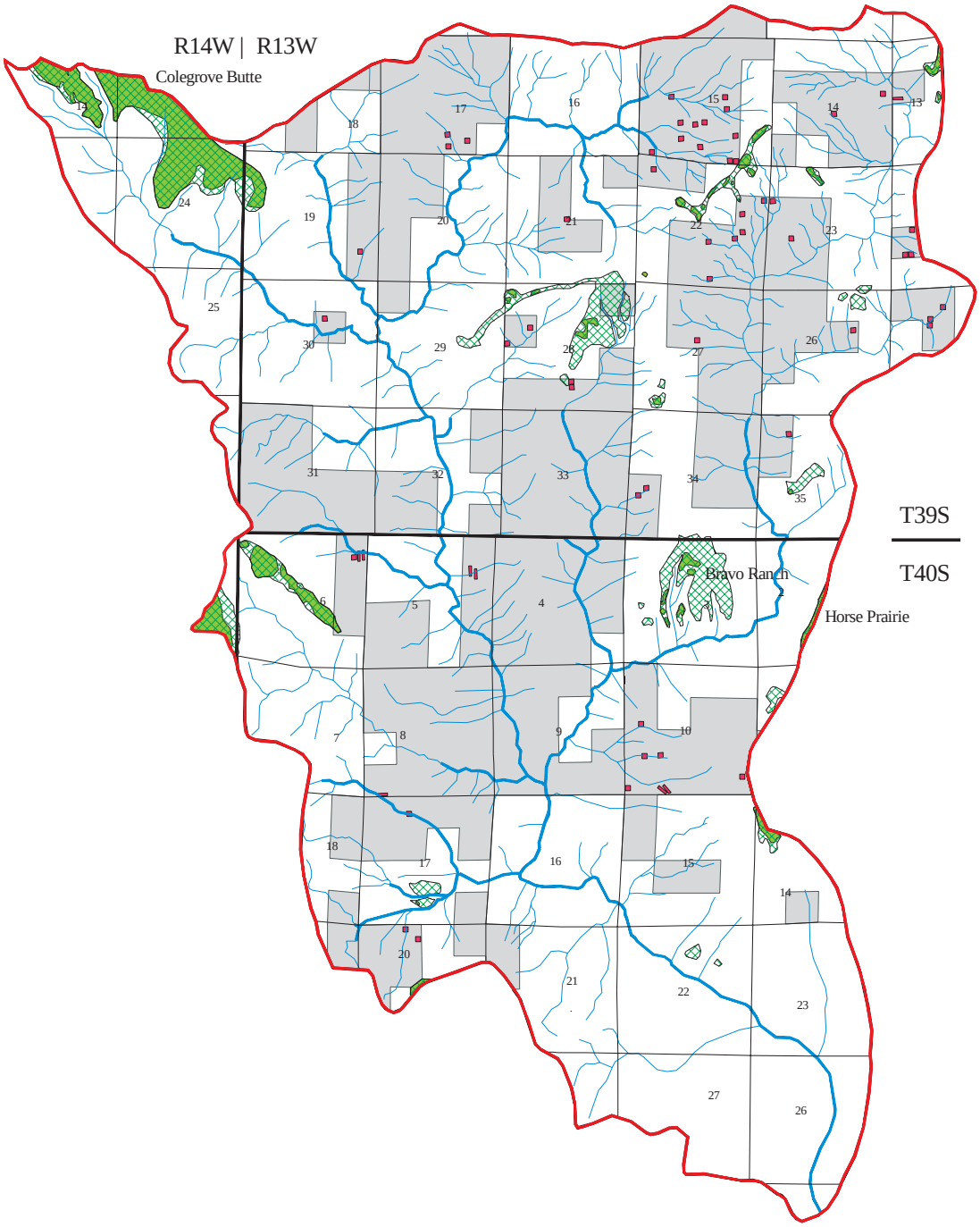
Stratifying the stands by age class or seral stage is especially difficult in this area. FOI is often inaccurate and one age class may often encompass stands of varying ages and densities. At least half of the stands in the 41 to 80 year age class contain tanoak. These stands contain trees of multiple ages and small pockets of older conifer which have not been represented. This data for older stands (>40 years or so), FOI offers the best available picture of forest condition. FOI information for young (managed) stands, particularly those < 30 years old, is far more accurate. Data on private lands is interpreted from aerial photography and is less accurate.

What are the special or unique plant communities and the processes affect them?

Meadow Areas

Visual estimates from 1940 aerial photos show approximately 1000 acres of meadow type habitat (Figure V-3). These 'grass balds' were commonly located on high ridgetops with generally a southern exposure and are strongly associated with soil type 255E. A weaker association exists for soil types 066E, 152E, and 238D. The origin of some of these areas may owe their existence to fire (Franklin and Dyrness 1973). Human influence probably was the factor in establishing the larger meadows located along the boundary of the analysis area.

Figure V−3 Special Habitat Areas



Areas, such as Horse Prairie and Bravo Ranch, were maintained through grazing practices. The remains of old fencing can be located along the edges of several other meadows. As to the smaller meadows in the center portion of the analysis area, these may have been maintained in an open condition by wildfire or by Native Americans. Agee (1993) suggests that Native Americans may have frequently burned areas along ridgetops to maintain open travel corridors and promote the growth of hazel and beargrass.

Currently, there are approximately 500 acres (2% of the analysis area) of open meadow habitat left, most of which are the larger areas still being grazed by livestock. The smaller ridgetop grass bald areas are have been reduced in size by encroachment of Douglas-fir. This is due to the current policy of wildfire suppression or intentionally by planting of tree seedlings.

What effect does fire and other disturbances have on the vegetation communities found within the analysis area?

It is unlikely that any plant species have been extirpated from the analysis. Historically, plant diversity most likely remained stable over time with the species composition fluctuating depending on the age of the forest stand. Following disturbance events, many early successional species most likely invade these disturbed areas. Once canopy closure was reached, plant diversity temporarily decreases, until the stand reach an age where canopy gaps began to develop and diversity again increases.

<u>Fire</u>

Large fires, whether natural or human caused, do not typically consume all vegetation within its boundaries. In addition, fires of differing intensities result in a complex landscape with gradual transitions between stands and many complex stands with varying species compositions and differing amounts of residual stand components. This is particularly evident within the analysis area.

The 1939 fire (Figure III-25) resulted in a predominately even-aged cover of tanoak with large residual Douglas-fir adjacent to streams or on more protected northerly aspects (refer to Section IV.4-Riparian Habitat).

The area around Palmer Butte (Sec. 10, T. 40., R. 13 W.) has been burned over several times in a relatively short time. Currently, this area burned has a dense cover of manzanita, but young Douglas-fir are reestablishing themselves and will eventually dominate the site in the absence of additional fire. Stands burned in 1945 in Sec. 33, T. 39., R. 13 W. that had areas covered predominately by tanoak in the 1950 aerial photos, display a cover of mixed hardwood/conifer on the 1992 photos.

Fire intensity may play a more important role in controlling the which plant species will dominate the site. A low intensity fire will remove the understory hardwoods such as tanoak and Pacific madrone, while the dominate more fire-resistant Douglas-fir survive. These hardwoods species have the ability to sprout from their roots and will re-occupy understory again. In stands with older fire-resistant bark, moderate intensity fires burn back the hardwoods, while preparing sed bed for the remaining Douglas-fir to reseed. Douglas-fir, which can seed prolifically on bare soil in this

area, will eventually grow through the hardwood canopy if it becomes established. Thus, fires of this intensity may be an important factor in converting tanoak stands to those dominated by Douglas-fir. With the policy of wildfire suppression, this process will not be allowed to occur and hardwood stands will not convert to conifer. A high intensity burn or one in a young Douglas-fir stand will kill this Douglas-fir seed source and pure hardwoods or species such as knobcone pine and manzanita will dominate the new stand (Agee 1993 and USFS Forest Service 1996a). Repeated fires will similarly result in stands of these species.

Wind

Like landslides, small isolated areas of blowdown of hardwood trees in the mixed conifer/hardwood stands may aid in the establishment of Douglas-fir seedlings. These small blowdown areas result in exposing bare soil when the root mass is lifted out of the ground. The resulting bare soil serves as a seedbed for the Douglas-fir.

Human Disturbance

Current disturbance patterns are typically human caused (extraction of forest products) and tend to simplify forest conditions (such as creating a single aged stands, removing large down wood, and intense site preparation) which create definite edges. These current disturbances also occur on a more regular basis, and occur are repeated over shorter time frames. Historic disturbances (fire, wind, pests, and landslides) on the other hand, were generally low in intensity (the exception being stand replacing events) thus creating more of a mosaic across the landscape which in some cases maintained or enhanced forest structure through the creation of more snags, increasing the amount of large down wood, retaining of live trees (both in small clumps and scattered), and creating forest gaps. Because of these factors, the diversity and biomass of these species was probably higher than what currently exists in the .

Across the landscape (including private land), early seral habitats are more common than late-seral habitats. On BLM lands, the historical large blocks of similar aged stands have been replaced with a fragmented pattern characterized by hard edges (distinct contrast between adjacent stands) and small patch size (on the order of 40 acres). During the 1970's and 1980's the Bureau restricted clearcut size to approximately 40 acres, and attempted to distribute their locations so that adjacent areas were at least 10 years old. The belief at that time was that this practice would benefit wildlife due to the resultant edge-effect (Thomas 1979). On private lands, larger areas have been harvested, and clearcuts were often adjacent to the previous years harvest, resulting in larger tracts of land uniform in age. Also, harvest during the 1950s and 1960s often removed the large conifer overstory (high grading) leaving the hardwood understory to dominate the stand after harvest.

Are there any special status or survey and manage plant species in the analysis area?

Special status plants currently known to exist include golden fleece (*Ericameria arborescens*) and Coast fawn lily (*Erythronium revolutum*).

Golden fleece is a species which reaches its northern limit in extreme southwest Oregon in Curry County but is widespread in California occurring to Ventura County. It is only known from three locations in Oregon totaling 21 plants. The one known site occurs along the Bosley Butte road, near the junction with the road that leads to top of Bosley Butte. In Oregon it occurs on hot dry

slopes with a southeast, south or southwest aspect (Zika 1993). This is usually the case for a southern species reaching its northern limit. This species appears to occur in early successional habitats and flowers more readily following a fire. Golden fleece appears to be associated with knobcone pine and chaparral habitats (Zika 1993). Locations of Coast fawn lily have been documented but not located in recent years. Coast fawn lily is at the southern limit of its range and occurs moist forest conditions and riparian areas.

No formal inventories have been conducted within the analysis area for bryophytes, lichens and fungi (including Survey and Manage and Protection Buffer species) and it is likely that many of these species occur.

What effect does the current forest condition have on hydrologic processes?

Table V-2 shows that 40% of all forest ownerships in the analysis area have an age of 40 years or less. Generally it has been found that increased annual water yields occur in young forest stands and full hydrologic recovery in regenerating forests is seldom achieved until the trees are large enough to be transpiring water effectively. Future timber harvest is anticipated to be on a 80 year rotation on BLM lands and shorter on private lands. This could result in approximately half of the analysis area being in less than 40 years of age. This may result in a downward trend in hydrologic recovery. However, there is insufficient modeling or research results to determine the effects of less than full hydrologic recovery on peak flow increases in precipitation dominated Coast Range areas.

Risk of peak flow increase (10-20%) is principally along tributary streams above 2000 feet. In this area, shallow snowpacks come and go several times each winter. Under the right climate conditions (intense rain with snow as stored water on the ground) increased runoff can result from many forest openings, as more snow is present and melts faster. Approximately 5% of the analysis area, centered around Upper Bravo and Bosley Creeks, is susceptible to this peak flow increase from too much removal of forest vegetation. If too much forest from the higher elevations is removed, or if roads and road drainage are not properly maintained, or if more than about 8% of the land area is compacted in tributary drainages, slight-moderate risk of increased peak flows will continue.

What effect does the current forest condition have on terrestrial habitats?

The combination of fire and salvage logging of snags and down logs has greatly reduced the availability of these habitat features for wildlife (see Sections V.2 & V.3).

It is not fully understood what impact the introduction of non-native grasses and forbs has had. Some early seral species have benefitted from their presence and surface erosion has been reduced, but the long term effects on the ecosystem are unknown.

What effect does the current forest cover have on soil and erosion processes?

The cover provided by the current forest canopy is sufficient to protect the soil and reduce its loss by erosional processes. Tanoak affords protection to the ground that is not available from other

hardwood species. Being an evergreen tree species, it retains a canopy throughout the winter months, protecting the soil from the direct impacts of rainfall. Following harvest, it may take approximately 6 to 8 years for the vegetation to produce sufficient cover to reduce surface erosion. The presence of tanoak can decrease this time frame to approximately 3 years by it ability to sprout vigorously from its roots.

Even with the trend toward removing the vegetation at regular intervals (80 year harvest cycle), it appears that surface erosion from harvesting should be sufficiently reduced, especially from BLM lands due to the filtering effects of the Riparian Reserve network. Harvest areas rapidly revegetate with sufficient ground cover to limit surface erosion. Riparian Reserve areas adjacent to streams will act to filter out sediment.

What is the trend for the vegetative communities within the analysis area?

Vegetative Composition

Plant diversity has probably remained relatively the same over time with minor fluctuations based on the amount of and time since the last disturbance event (natural- or human-caused). There appears to be no vascular plant species restricted entirely to late-successional forest conditions although some species reach their highest biomass in these communities, such as some mycotrophic plant species (Franklin et al. 1981). While some studies (Habeck 1968, Schoonmaker and McKee 1988) indicate that early successional stages have a higher plant species diversity, data from Spies (1991) indicates that species diversity may be higher in older forests (this is especially true when bryophytes, lichens and fungi are included).

The predominant Douglas-fir/hardwood plant community will undoubtably remain a viable component of the analysis area. However, the trend is different for special communities, such as meadows. With the intentional planting and rapid encroachment of Douglas-fir into these areas, the meadow community will probably disappear within the next 20 years. With the policy of wildfire suppression, it is probable that the adjacent Douglas-fir will eventually encroach and also replace most of the knobcone pine plant community. However, given the slow growth rates on these poor sites, this process will take many decades for the knobcone community to become absent.

The simplification of forest ecosystems through past intensive forest practices most likely has lead to a reduction in bryophyte, lichen and fungi diversity and biomass across the analysis area. This reduction also results in losing the important ecological roles that these species have in these ecosystems. Recently there have been some efforts by Tappenier and others to look at how some forest activities (thinning, density management) may increase the diversity of the these species in younger aged forests. Again, the direct cause of increased diversity and biomass of these species is not stand age, but the characters associated with older forests. If some of these habitat characteristics in younger forests can be created, it may be possible to maintain these species across the landscape. The creation of forest gaps, retention of green trees, snags, and large woody debris retention are important habitat components for these species. Work by Neitlich (1995) has shown some promising results that the diversity of these species can be maintained for younger age classes.

Age Distribution

Private lands and those BLM managed lands designated as GFMA will be maintained in an early to

mid-seral stage (40-80 yrs. old) depending upon ownership and timber market conditions. If private lands are managed on 60 year rotations, age classes may be fairly evenly split between 0-20, 21-40, and 41-60 year age classes. Stands in Reserve land use allocations will eventually develop into late-successional forests, which will eventually occupy at least 55% of BLM lands or 20% of the overall area.

While the age of the forest is important in determining the biomass and diversity of bryophytes, lichens and fungi, it probably is a result of many environmental and structural factors associated with older, mature forests. Older forests typically have greater canopy structure which provides more available and stable substrates, aids in air circulation, therefore ameliorating the relative humidity (lichens are unable to tolerate continuous high relative humidity (Goward 1992)), have greater amounts of large woody debris in all decay classes, and a higher diversity of tree species (Franklin et al. 1981, Spies and Franklin 1991). Therefore, it appears to be these habitat features associated with older forests and not stand age that influence the bryophyte and lichen diversity and biomass. It is quite possible for a younger forest with these habitat feature to have a greater diversity and biomass of these species than an older aged forest.

What is the management objective for vegetation in the analysis area? At what level and where can hardwood/brushfield conversions be performed?

The management objective for vegetation is to maintain the plant diversity (including genetic, species, and community diversity) found in the analysis area. The different plant communities contain a wide variety of species. The extirpation of native plant species should be viewed as a irreversible and irretrievable loss of a resource. Future planning of forest activities should consider the potential impacts to these species and way to create habitat features for the benefit of these species.

With BLM's current management direction, it is not likely that historic patterns of vegetation can be restored in the analysis area, primarily due to the policy of fire suppression. GFMA lands will be managed for timber production and early seral species where not in conflict with management of Key Watersheds. Forest practices under the Standards and Guides incorporates some of the key structural components produced by natural disturbance processes (ie., snags & down logs, species mixes, and landscape patterns). These objectives may also provide some benefit for mid and late-seral species. Silvicultural practices, such as precommercial thinning, commercial thinning, release treatments, fertilization, hardwood and brushfield conversions, are valuable tools to promote stand vigor, species mix and fully implement ecosystem management.

A majority of the tanoak dominated stands present in the analysis area are the result of human influence, fire or harvest. This may be a largest factor in that, as a whole, the acreage of hardwood stands throughout the Chetco basin is at the high point in its range of variability (USFS Forest Service 1996a). Being that, it would appear that some level of conversion of tanoak dominated stands to conifer or conifer-mix may be necessary. With 26% of the area in tanoak or mixed tanoak/Douglas-fir stands, ample opportunities are present for conversion opportunities.

V.2 TERRESTRIAL HABITAT

What are the key habitats or habitat components in the analysis area?

Key habitats and habitat components were identified using the following criteria:

- Habitats or components that are relatively scarce in the landscape.
- Habitats or components that support wildlife species of special management concern or that support an unusually high number of species.
- Habitats or components that might be affected by potential management actions .

Key habitats include:

- Vegetation Complexity and Species Composition - Fire has heavily influenced the species composition, distribution, and complexity of vegetation and structure available at a particular location and across the landscape (see Section III.7-Disturbance). Fire suppression, timber harvest, and planting (or lack of planting) during the last 50 years has begun to change the composition, structure, and distribution of vegetation. Future management actions such as timber harvest and silvicultural activities will continue to influence vegetation complexity and species composition. The changing vegetation and distribution of the vegetation heavily influence wildlife which depend on the vegetation for habitat.

- Snags and Down Logs - Snags and down logs are critical habitat components because they support such a large number and variety of species including invertebrates, amphibians, woodpeckers, and cavity-nesting birds and mammals. They also fulfill other important ecological functions such as nutrient cycling and moisture storage.

- Rocky Habitats - Compared to Coast Range habitats, the Klamath Province provides a larger number and variety of rocky habitats. These rocky habitats include talus, rocky outcrops, and larger cliffs; the analysis area contains many rocky habitats distributed across it. These rocky habitats provide unique microclimates which in turn, support many fairly specialized wildlife and plant species including several species of special management concern.

What was the historical condition, pattern, and distribution of key habitats in the analysis area (Reference Conditions)?

<u>Vegetation Complexity and Species Composition</u>

Historic aerial photos (1940) show a landscape with large and small Douglas-fir trees, often along drainages, and especially prevalent in the southern and southwestern portion of the analysis area which was not disturbed by the 1939 fire. Tanoak was also very common, especially on side slopes and ridges and in the middle portion of the analysis area. Tanoak stands often contained fingers or patches of Douglas-fir. Knobcone pine occupied areas of more intense fire or poorer soils on some ridge tops and in the Bosley Butte area. Meadows occurred on a few ridge tops. Other than the large area of knobcone pine around Bosley Butte, pure stands were uncommon as areas usually contained complex mosaics of Douglas-fir, tanoak and other hardwoods, with occasional patches of

knobcone pine or meadow. Fires left occasional large, irregularly-shaped brush fields and early successional stands (refer to Sections V.1-Vegetation and III.7-Disturbance for more discussion of fire effects). Snags (and eventual down logs) were often patchily distributed across the landscape and through time, as occasional fires created pulses of snag and down log availability (see Snag and Down Log discussion below).

The 1940 photos reveal many meadows on ridge tops in the headwaters of Jim Ray Creek, on Colegrove Butte, and on the ridge separating Ransom and Bravo Creeks. Some of these could have been created and maintained by actions of early European settlers. Settlers set frequent fires in southwest Oregon in the late 1800's and intensive sheep and cattle grazing occurred around the turn of the century (Atzet and Wheeler 1982).

Snags and Down Logs - Historic aerial photos reveal a patchy distribution of snags (and eventual down logs) across the analysis area. Occasional fires created pulses of snags which would then progress through decay classes. The Siskiyou Natl. Forest measured down log levels in vegetation plots and found 2800 ft^3/acre (three standard deviations encompassed 550-5100 $ft^{3/}$/acre) for the tanoak plant association series. This figure needs to be verified and checked for applicability to the analysis area. Table V-3 shows average availability of snags and down logs in unmanaged stands in the Klamath Province from Bingham and Sawyer (1991). Their study area did not include any coastal sites in southwest Oregon, so their findings may not be directly applicable to the analysis area.

Rocky Habitats - The analysis area contains many rocky habitats throughout it. Rocky outcrops and associated talus are often intrusions of different geologic parent material (Ti or Jv) found in such places as Colegrove, Bosley, Palmer, and Cassidy Buttes. Rocky outcrops are especially prevalent in Bravo Creek and south of Bosley Butte. Talus habitats are also common except in the Otter Point formation in the northwest corner of the analysis area.

Rocky outcrops and cliffs provide unique nesting habitat for raptors, swallows, and other birds. They also absorb heat during the day and release it through the night providing a unique microclimate with tempered daily temperature fluctuations. The microhabitats provided by rocky outcrops and talus are heavily influenced by surrounding vegetation. Some of these rocky habitats burned intensely or contained relatively unproductive soils which supported short, dense stands of knobcone pine. Others were located low on slopes and were perpetually shaded by hillsides and large Douglas-fir trees which survived the occasional fires. Variety of microclimates across the landscape and through time characterizes rocky habitats in the analysis area.

Table V-3 Average numbers of snags/acre and volume of down logs/acre (all decay classes)[+- 2 standard errors] in naturally regenerating stands in the Klamath Province (from Bingham and Sawyer, 1991).

	Young (40-100 yrs old)	Mature (101-200 yrs old)	Old Growth (>200 yrs old)
# conifer snags/acre >= 16 in. dia. and 13 ft tall[1]	0.6 [0.2 - 1.1]	0.6 [0.1 - 1.0]	2.0 [1.2 - 2.8]
# hardwood snags/acre >= 8 in. dia. and 7 ft tall	2.7 [0.8 - 4.6]	8.1 [4.0 - 12.2]	2.1 [1.1 - 3.0]
# down logs/acre > 17 in. dia. and >=13 ft. long	11.8 [5.2 - 18.3]	2.9 [1.0 - 4.9]	10.0 [7.6 - 12.4]
biomass (ton/acre) of down logs > 17 in. dia. and >=13 ft. long	7.2 [2.7 - 11.8]	1.6 [0.6 - 2.5]	8.1 [4.9 - 11.3]
volume of down logs > 17 in. dia. and >=13 ft. long (ft^3/ac)[2]	808 [309 - 1316]	175 [65 - 284]	908 [549 - 1267]

[1] Minimum retention levels for snags from the RMP equate to approximately 40% (theoretically) of levels found in natural stands.
[2] The minimum down log retention levels for hard logs (decay class 1 and 2) from the RMP equate to 167 ft^3/ac (approximately 18-95% of what is found in natural stands). Divide ft^3/ac by 1.39626 to get the number of feet of 16 inch diameter log necessary to equal the given volume. Biomass figures from Bingham and Sawyer (1991) were converted to volumes using average density figures for Douglas-fir logs, decay class 1-4, reported in Spies et. al. (1988).

What is the current condition, pattern, and distribution of key habitats in the analysis area ?

Vegetation Complexity and Species Composition - On the Coos Bay District, the systematic forest inventories needed to accurately evaluate the abundance and distribution of key vegetative and structural forest components have not been conducted. As a result, only a general analysis of forest complexity and its effects on wildlife can be presented at this time. These inventories need to be conducted to facilitate more detailed future analysis.

The majority of the area (83%) supports early seral habitat, the vast majority of which is the result of timber harvest (clear cuts or high grading) (Table V-4 and Figure V-4). Compared to other subwatersheds in the Resource Area, the North Fork Chetco analysis area contains larger blocks of relatively unmanaged stands. Conventional methods of logging, site preparation, regeneration, and stand maintenance do not mimic the natural disturbance processes thought to have maintained this landscape prior to Euro-American settlement; these managed stands generally lack the snag, down log, and remnant trees that often remained after fires. In the mid 1900s, large Douglas-fir trees were sometimes high-graded out of stands leaving hardwood dominated stands with few young conifers to replenish those that were taken out. Harvest also altered the pattern of vegetation, replacing the irregular, and often finger-like, mosaic with a more regular pattern. A landscape with lots of low contrast edges has been replaced with possibly less edge, but generally high contrast edges. The ultimate result is a vegetatively and structurally simplified landscape.

Figure V−4 North Fork Chetco Seral Stages

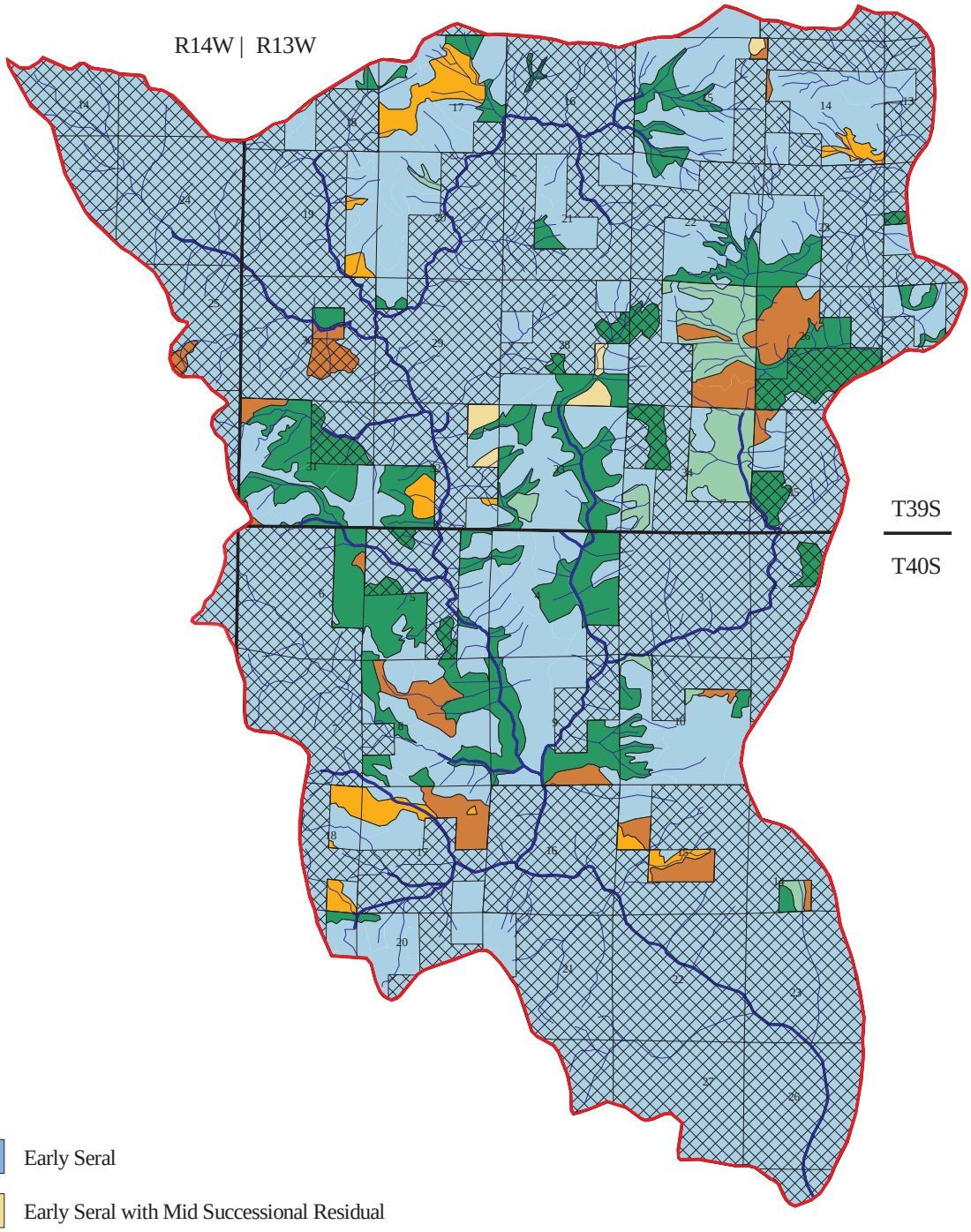


Table V-4 Acreages of Various Seral Stages

	BLM Ownership (9,262 ac)		Private Ownership (16,300 ac)		TOTAL (25,252 ac)
Seral Stage*	Acres	% of BLM	Acres	% of PVT	% of Total
Early Seral	5501	59%	15663	96%	83%
Early + Residual Late-seral	401	4%	0	0%	2%
Early + Residual Mid-seral	90	1%	0	0%	0%
Mid Seral	642	7%	114	1%	3%
Mid + Residual Late-seral	508	5%	0	0%	2%
Late	2120	23%	523	3%	10%
Totals	9262		16300		

* Seral stages classifications were based on tree size, stocking density, number of canopy layers, and age (private land only).

Fifteen percent of the analysis area supports a combination of mid and late-successional forest patches, found almost exclusively on BLM administered lands (Table V-4 and Figure V-4). Many of these late-successional forests are along streams. From a habitat perspective, these stands are vegetatively and structurally complex, containing canopies of much greater volume and habitat complexity than the single storied, uniform canopies typical of many plantations. These complex stands support a greater abundance and diversity of birds, bats, rodents, invertebrates and other species which forage, roost, or reproduce in the canopies; however, the small size and relative scarcity of these patches may limit their value for some species.

In the analysis area (as with other areas in the heart of the Klamath Province), drainage density (4.3 $mi/mi.^2$) is lower than many Coast Range watersheds and the contrast between vegetation along streams and the uplands is greater. Vegetation along streams (the remnant old-growth patches which regularly escaped stand-replacement fires because of their location) offers more structural diversity than vegetation upslope. These linear patches of late-successional forest likely offer more vegetation layers; as well as more cavities, broken tree tops, deformed limbs, etc. than upslope vegetation. The diversity of tree species (and presumably other species as well), particularly hardwoods, is also greater along streams.

Snags and Down Logs - Little information exists on current availability of snag and down log habitat in the analysis area. Stream habitat inventories along Ransom, NF Chetco, and Bravo creeks found 0.8 snags/acre within 100 feet of the streams (Table V-5). Managed stands probably have very little snag and down log habitat on them because management practices generally did not require or encourage the retention of these structures. Limited pre- and post-harvest fuels inventories showed few, if any, down logs. Post harvest fuel inventories support the assumption that harvest units retain few down log and snag structures. If managed stands contain few if any down log and snag structures, that means that 61% of the analysis area may be deficient in these

important habitat structures.

Table V-5 Numbers of snags/acre (all decay classes) within 100 feet of streams in the North Fork Chetco subwatershed (from 1995 Riparian Vegetation Inventories).

	Ransom Cr (mostly unmanaged)	NF Chetco R. (mostly heavily managed [pvt.])	Jim Ray Cr (all BLM, some mgmt)	Totals
# conifer snags/acre >= 16 in. dia.[1]	0.8	0.4	1.0	0.6
# conifer snags/acre >= 11 in. dia	0.9	0.5	1.1	0.7
# hardwood snags/acre >= 8 in. dia.	0.2	0.1	0.1	0.1

[1] Minimum retention levels for snags from the RMP equate to approximately 1.5 hard snags/acre.

Rocky Habitats - The availability of rocky habitats remains unchanged from historic conditions. Based on some limited field surveys, many of these formations contain at least one or two deep cracks that could be used by bats. Many also contain protected ledges or cavities that could be used by other wildlife for resting. Talus areas provide habitat for invertebrates, amphibians, sharp-tailed snakes, among others. Figure V-3 shows locations of some rocky outcrop habitats.

How have management activities affected the condition, pattern, and distribution of key habitats in the analysis area?

Vegetation Complexity and Species Composition - Approximately 61% of the area has been harvested. Harvest has changed structurally diverse stands into stands with a more uniform structure and species composition (mostly Douglas-fir). Stands which were high-graded similarly have had their structural complexity reduced and their species composition changed to reflect a higher hardwood species composition. Both types of harvested stands generally contain less vertical structure (one or two canopy layers instead of 2-4). The hardwood stands present in the analysis area are primarily the result of human caused fires since the mid 1800's. The ratio of conifer dominated stands to hardwood dominated stands prior to Euro-American influence is unknown. The effects to wildlife of simplifying the structure and composition of stands are unclear. Species such as spotted owls which require diverse forest structures like multiple canopy layers, diverse roosting options, deformed or dead trees, have likely declined in abundance as their habitat has been removed and degraded (simplified).

The pattern of vegetation has also been changed by management. Patch size has probably decreased. Mid and late-seral conifer stands were most common on north and east aspects and early seral stands and hardwood more common on south and west aspects. Forest management disrupted this pattern by fragmenting it with harvest units. The continuity of late-seral conifer stands along streams was also disrupted by creating hardwood-dominated stands in some areas (by

high-grading conifers) and conifer-dominated stands in other areas (by planting and intensive maintenance of conifers). Where low and moderate-contrast edges were prevalent historically, high contrast edges now dominate. Some stands that once grew conifers, now support only hardwoods because conifers were high-graded out. High-grading usually occurred along streams and on private lands. Many current hardwood stands are the result of human-caused fires; although fires would likely have naturally burned some of these same areas on their own.

Fires have perpetuated early-seral forest, meadow, and knobcone pine communities. These habitats, with the exception of meadows, were always common in the landscape and are still common in the analysis area. The "naturalness" of meadows is subject to question as they may be the result of consistent livestock grazing. These habitats certainly support unique plant and animal communities. The meadows are also undoubtedly shrinking in the analysis area as conifers are planted or otherwise encroach upon them.

Snags and Down Logs

Snags- The Snag Recruitment Simulator Model (Marcot 1991) suggests that approximately 1.5 hard snags/acre, >= 11 inches dbh, distributed across the landscape are necessary to provide sufficient hard snags in the present and soft snags in the future to meet the RMP minimum of 40% cavity nesting bird potential. Approximately 4 hard snags/acre >= 11 inch dbh are necessary to provide 100% cavity nesting bird potential. See Appendix D, Table D-1 and D-2 for snag numbers and sizes necessary to meet various cavity nesting bird potential. The model further suggests critical snag shortages in the near future, unless additional snags are created through management. Even with aggressive snag creation efforts, sort-term shortages of soft snag habitat are probably inevitable because it takes 19-50 years for a hard snag to become a soft snag, decay class 3+ (Cline et. al. 1980). (Refer to Appendix D for further information on snag model runs).

The District RMP directs that snags be retained sufficient to support cavity nesting species at a minimum 40% of potential population levels throughout the GFMA. It will take at least 60 years (one harvest rotation) to eventually meet the 40% population level on GFMA lands, if snag creation efforts are limited to harvest units. It is possible to hasten the attainment of the 40% population potential goal on GFMA lands by either managing for >40% population potential in harvest units or creating snags on other GFMA lands before they are subject to regeneration harvest. Even if these levels are eventually achieved throughout the GFMA, actual cavity nester population levels on the landscape will likely be much lower, due to the lack of snags on intermingled private lands.

Snag abundance is also probably critically low on Reserve lands and will continue without aggressive snag creation efforts. The current lack of hard snags (and therefore, future soft snags) creates a situation where it will be impossible to meet snag density goals for both hard and soft snags for at least 19-50 years.

Location of snags is also important. Preliminary radio telemetry data on bats suggests at least some species may preferentially roost in ridge top snags. Harvest practices in the past tended to leave most wildlife trees on the edges of harvest units, but doing so precludes options for maintaining snags in a variety of topographic positions. Snags representing a variety of decay classes, topographic positions, seral stages, and distributions (i.e. large and small clumps and singly) need to be provided through time.

Backup data for Table V-3 suggests that hardwood snags (and presumable down logs as well) are common in Klamath Province forests of all ages. This data indicates that the density of hardwood snags was 4-5 times that of conifer snags in young stands. Current NFP/RMP management for these structures relies heavily on retention of 6-8 green conifer trees/acre in harvest units. Retention of hardwood trees in harvest units would provide future hardwood snags and down logs.

Down Logs- Although the District RMP establishes interim guidelines for down log retention within regeneration harvest units, these guidelines are considered a minimum requirement until more accurate models are developed which establish specific down log retention levels for groups of plant associations or stand types. For most regeneration units harvested using the minimum retention requirements, down log volumes after treatment would likely be much lower than average values for naturally regenerated forests because a portion of class 3 -5 down logs are inevitably destroyed during the logging process. Minimum retention levels are approximately 18-95% of the level found in natural stands. If down log creation efforts are limited to future harvest units, it will take at least 60 years (one harvest rotation) to eventually meet down log targets on GFMA lands. It is possible to hasten the attainment of down log target levels on GFMA lands by either managing to exceed target levels in harvest units or creating down log habitat on other GFMA lands before they are subject to regeneration harvest.

Down log abundance is also probably critically low on reserve lands and will continue without aggressive down log creation efforts. The current lack of hard snags and down logs (and therefore, future down logs) creates a situation where it will be impossible to provide adequate soft down log habitat in the future.

Rocky Habitats
The larger rocky outcrops have never supported much tree cover that could offer shade. They have probably always been exposed to wide temperature/moisture fluctuations as they endured direct sunlight and wind exposure. Vegetation around talus and small rocky outcrops changed as fires and timber harvest set stands back to an early successional stage. For example, rocky habitats, which are common in the Bravo Creek area, were generally surrounded by early seral vegetation after the 1939 fire; these rocky habitats are now surrounded by mid-seral vegetation. This surrounding vegetation strongly impacts the microclimates that these rocky habitats offer to wildlife. Several species including bats, raptors, and woodrats utilize these habitats for roosting, nesting, or resting because of the special microclimates these habitats offer.

What is the current open road density, and how does it compare with goals from the RMP?

The current road density for the analysis area averages 3.6 miles/mile^2. The density of roads on BLM lands is substantially lower at 2.3 miles/mile^2 (Table F-1, Appendix F).

The RMP states that the goal for open road density in this portion of the District should be 2.9 miles/mile^2. Access into the analysis area is controlled and restricted by South Coast Lumber Company through a series of gates and, as access is restricted, these roads are technically closed. Therefore, open road density remains well below RMP guidelines; total road density on BLM lands is also below RMP guidelines.

According to South Coast Company policy, roads are open only to company/contractor personnel into current harvesting operations and to the general public for a short time period during fall deer hunting season. However, these roads still get substantial administrative use by the BLM and South Coast Lumber. The effectiveness of this type of road closure is definitely not as high as a road closed with a permanent barrier year round.

What is the function of the analysis area within the larger landscape? How does the LSR function in the larger LSR network?

Landscape Function - Reference Condition
Aerial photos from 1940 indicate that much of the southern third of the analysis area provided late-successional habitat. Much of the northern 2/3 was early successional and hardwood habitats and meadows with late-successional habitats primarily confined to stream sides. This dynamic, fire-influenced mosaic of late and early successional habitats undoubtedly supported many species associated with all these habitats. Given the proximity to the ocean and the current murrelet activity found in fragmented habitats, the area was likely a stronghold of murrelet nesting activity. The majority of the LSR has burned this century (Figure III-25).

Landscape Function - Current Condition
Since the analysis area is only 2-9 miles inland and on the edge of the main forest network on Forest Service land, it does not function as a critical dispersal or movement area for mobile, late-seral wildlife. Its proximity to the ocean does hold unique function for those few species, such as marbled murrelets, which use both inland and ocean habitats. Its function and significance are more local in scale in providing special habitat areas and populations of species on the western edge of their range. The analysis area provides important special habitat areas (such as rocky habitats and springs/seeps) and locally important wildlife populations which can contribute to the populations further inland.

The North Fork Chetco LSR (#251) is on the western periphery of the network of large LSRs. A large LSR in the Siskiyou National Forest is 2 miles east of the Chetco BLM LSR. Since LSR #251 is outside of the main LSR network, it does not contribute to connectivity between the large LSRs. As its primary function, LSR #251 provides habitat for species of local interest (e.g. California slender salamanders) and species that are ocean-influenced (e.g. murrelets). This small LSR also bolsters the function of its much larger LSR neighbor to the east by supporting reproducing late-successional wildlife species which then produce dispersing young to help populate the larger LSR. Approximately 40% of the murrelet habitat in the LSR has been surveyed and these surveys suggest a high probability that other habitat in the LSR may be occupied by murrelets.

Does the larger 5th field watershed meet the minimum 15 % retention requirement of late-successional habitat and where is it located?

Both the Northwest Forest Plan and Coos Bay's RMP require the retention of late-successional forests in fifth-field wartersheds "in which federal forest lands are currently comprised of 15 percent or less late-successional habitat". Late-successional forests are those seral stages that include mature (80 to 159 years old) and old-growth classes (160 years and older)(S&G B-1). The highest priority for retention should be the older age classes on those lands which have a 'reserve' designation (i.e., Late-Successional Reserve, Riparian Reserve, Administratively Withdrawn Reserve), followed by GFMA & Connectivity land use designations.

The Lower Chetco 5th-field watershed contains 10,970 acres of Federally managed lands and 15% of these (1645 acres) must be maintained in the late-seral condition. According to FOI and Forest Service information, the Lower Chetco 5th field watershed contains 3818 acres of late-successional habitat, 2638 acres of which are located in LSR or other Reserve areas (Table V-6). Therefore, the objective of retaining 15% of the federal land base in transition or old-growth habitat types will be met through the Reserve network.

Some inaccuracies have been noted in the FOI data. The analysis area contains stands listed as 50 to 70 years old, predominately in the tanoak cover type which resulted form historic fires. These stands commonly contain remnant stands of Douglas-fir upwards of 200 years old, which are not reflected in the data base. These stands are primarily located adjacent to streams. In addition, some stands listed as 1840 birth date are actually over 275 years old. Therefore, the amount of late-successional habitat may actually be slightly higher than shown.

Table V-6 Late-Successional Habitat Acreage - Lower Chetco 5th field Watershed

Land Allocation	Lower Chetco 5th field (10,970 total Federal* acres)			
	0 - 79 yrs	80 - 119 yrs	120- 159 yrs	160+ yrs
LSR & MM Reserves	1892 (17 %)	514 (5%)	182 (2 %)	-
Riparian Reserves**	1389 (8 %)	410 (4%)	1124 (10 %)	52 (<1%)
other withdrawals	768 (7 %)	71 (<1%)	260 (2%)	25 (<1%)
CONN	75 (<1%)	34 (<1%)	2 (<1%)	17 (<1%)
GFMA**	3028 (28%)	424 (4%)	694 (6%)	9 (<1%)
Totals	7152 (65%)	1453 (13%)	2262 (21%)	103 (<1%)

* This figure includes 9370 acres of BLM and 1600 acres of Forest Service Lands within the 5th field watershed. Forest Service lands are within an LSR.

** This figure reflects the Riparian Reserve acres within the BLM managed lands only.

For comparison purposes, the percentage of late-successional forest within the North Fork Chetco analysis area shown below in Table V-7.

Table V-7 Late-Successional Habitat Acreage - North Fork Chetco Analysis Area

Land Allocation	North Fork Chetco (9,262 total BLM acres)			
	0 - 79 yrs	80 - 119 yrs	120 - 159 yrs	160+ yrs
LSR & MM Reserves	527 (6%)	279 (3%)	182 (2%)	-
Riparian Reserves & other withdrawals **	2127 (23%)	481 (5%)	1384 (15%)	77 (<1%)
CONN	75 (<1%)	34 (<1%)	2 (<1%)	17 (<1%)
GFMA	2950 (32%)	424 (5%)	694 (9%)	9 (<1%)
Totals	5679 (61%)	1218 (13%)	2262 (24%)	103 (2%)

** The acreage within Riparian Reserves is calculated from an edited HYD coverage which allows for this calculation. This acreage does not account for additional streams which will be located upon field reviews or minor modification of riparian reserve widths on intermittent streams.

How has timber harvest under the Rescission Act affected the function of the LSR?

The 1995 Rescission Act timber sales removed approximately 72 acres of late-successional and other habitats from the LSR (Appendix D - Table D-3 for unit specifics). A District-wide Plan Evaluation was conducted to assess impacts of Rescission Act timber sales on the LSR network and the NFP. This plan evaluation found that "the difference between the effects of the Rescissions Act ... sales as harvested and the effects of these sales as analyzed in the FSEIS and anticipated in the ROD is not sufficient to alter the validity of the decisions in the RMP..." Similarly, in a REO review of Rescission Act sales, the REO "determined that the capacity of the regional Late-Successional Reserves and Riparian Reserves network to provide the Federal contribution to the recovery of NSO and marbled murrelet remains intact."

While the regional and District-wide impacts may not have been significant, locally unit 6 of the North Fork Chetco timber sale removed habitat that was probably occupied by marbled murrelets.

Landscape Function

Because of the impacts of Rescission Act sales and past harvest activities, only approximately 39% of the LSR currently provides late-successional habitat, which is probably much less than historically. Most LSRs are currently well below their potential to provide late-successional habitat. Late-successional habitat is still being harvested on Matrix lands before similar habitats have a chance to develop on LSRs. This situation creates a bottleneck in the next few decades for species dependent on late-successional habitats. This makes it imperative to facilitate development of late-successional habitat characteristics on existing mature habitats in Reserve areas to ease passage through this bottleneck. Similarly, facilitating development of these characteristics in early-successional stands in Reserve areas will decrease the time it takes to move through the bottleneck.

The importance of special habitat areas such as rocky outcrops and talus, seeps and wetlands and the microclimates they provide emphasizes the need to maintaining a variety of seral conditions around these microhabitats (i.e. don't have early seral conditions around most of the rocky outcrops

at any one time period). At any one time in the past, a portion of the rocky habitats had varying ages of stands recovering from the affects of different fires. The proportion of seep and wetland habitats in stands affected by fires was probably less than that for rocky habitats because the moister conditions discouraged fires. Nonetheless, some were almost undoubtedly in early seral habitats.

What are the influences and relationships of key habitats with other ecosystem processes in the analysis area?

The cooler, moister microclimate around riparian areas moderated the effects of fire in these areas allowing development of late-seral habitats (refer to Section III.7 Disturbance). Klamath Province soils and geology provide the rocky habitats that are common in the analysis area (see Sections III.1 Geology and III.2 Soils).

What are the management objectives (desired condition) for the wildlife habitat in the analysis area? How should habitat types be arranged (spatially and temporally)?

LSR and Riparian Reserve areas should be dominated by late-seral Douglas-fir habitat. Nearly the full width of Riparian Reserves in the lower portions of drainages should generally be in late-seral habitat. Riparian Reserves in headwaters should contain narrower fingers of late-seral habitat along the streams with hardwoods more prevalent in the upslope portion of the Riparian Reserve. The LSR should also continue to contain areas of knobcone pine on appropriate soils along the ridge separating N. Fk. Chetco River from Ransom Creek.

Conifers should be restored in hardwood stands, particularly along streams on north and east slopes, where the conifers had been harvested out and never regenerated. This would begin to reconstruct the habitat patterns of the past and facilitate movements of wildlife associated with these habitats. On areas where hardwoods dominate because of fire disturbance, information on fire history (including whether it was a natural or human-caused fire) and historical species composition should be used to prioritize and evaluate individual projects. A higher priority should be placed on projects in areas that burned in human-caused fires and lowest priority on hardwood stands resulting from soil types and natural disturbances .

In southwestern Oregon coastal forests, fires have been re-occurring approximately every 90-150 years (Agee 1991). If this same schedule persisted, the area might be due for another large fire after the turn of the century. Considering that the next decade or two will be the "bottleneck" for the survival of many late-successional species, it may be prudent to postpone prescribed fire projects in mature/late-successional forests for restorative purposes for several decades.

Tanoak should continue to be a component of stands. Stands historically dominated by hardwoods or brush fields should generally be allowed to continue their hardwood/brush field seral stage trajectory to conifer strands. This will allow time for these stands to continue to produce nuts and seeds for wildlife. Some hardwood and mixed hardwood/conifer stands could be modified to increase the conifer component and meet the habitat needs of species associated with these habitats.

Open meadow habitat on BLM lands in the upper part of Ransom Creek and Morton Butte area should be re-established, where they have been encroached upon by trees. Portions of the analysis area should continue to support brush fields and knobcone pine where fire intensity and soils encourage these types of stands (Bosley Butte and upper Bosley Creek area). Rocky habitats in a variety of vegetation seral stages should be available.

Snags densities should support at least 40% cavity nester potential in harvest areas and at 100% cavity nester potential in Reserve areas. Forty percent potential equates to approximately 1.5 hard snags/acre and 100% equates to approximately 4 hard snags/acre.

V.3 TERRESTRIAL SPECIES

What are the species of concern in the analysis area including species associated with key habitats or habitat components? What habitats are they associated with?

The species of concern[2] were identified using the following criteria:

- Survey & Manage species (S&M) - the NFP recognized that these species were not sufficiently protected by other mitigation and that further protection was necessary.
- Protection Buffer Species (P) - the NFP identified specific protective measures for these rare and locally endemic species
- Special Status Species (SSP) - species listed as Threatened or Endangered under the ESA or listed as Bureau Sensitive species
- Riparian Reserve Species (RR) - species identified as benefitting from increased Riparian Reserve widths using the procedures described in the RR Module (see BLM Information Bulletin No. OR-96-162).
- Supplemental EIS Appendix J2 species (J2) - these species were considered in the Northwest Forest Plan but were not expected to fare well under the draft Option 9 FEMAT proposal; therefore, Option 9 was modified for the final EIS to better address these species. The species viability ratings however, were never formally reassessed.
- Local Concern (Local) - Species of local concern.
- Species were potentially affected by anticipated management actions.

Species of concern in the analysis area were determined based on the above criteria and present knowledge of the range of each species. Table V-8 lists the species of concern that were identified for the analysis area, along with the reason for their inclusion. Table V-9 lists the habitat associations of the species of concern.

[2]The phrase "species of concern" is used to refer to the group of species for which special management concern exists in the analysis area (consistent with the use in WA Guide Ver 2.2) and is not to be confused with the species of concern list maintained by the U.S. Fish and Wildlife Service which is roughly analogous to the former Federal Candidate 2 species list.

Table V-8 Wildlife Species of Concern in the North Fork Chetco Analysis Area.

GROUP	SPECIES	REASON	COMMENTS
Amphibians	Foothill yellow-legged frog	ssp	
	Tailed frog	J2, RR, ssp	
	Southern torrent salamander	J2, RR, ssp	
	Del Norte salamander	S&M, P	
	California slender salamander	Local	small range, uncommon, local concern
Mammals	Red tree vole	J2, RR, S&M	
	White-footed vole	ssp	
Bats	Big brown bat	RR	
	California myotis	RR	
	Fringed myotis	J2, RR	
	Hoary bat	J2, RR	
	Little brown myotis	RR	
	Long-eared myotis	RR	
	Long-legged myotis	RR	
	Silver-haired bat	J2, RR	
Birds	Golden eagle	Local	uncommon in District, local concern
	Peregrine falcon	ssp	
	Great gray owl	S&M	may not occur in District
Reptiles	Sharptail snake	ssp	

Table V-9. Habitat Associations for Species of Concern.

Species	Primary Habitat Association	Secondary Habitat Association	Key Habitats/Features Affecting the Spp			
			Veg	Snags, Down Logs	Rock	Riparian
Foothill yellow-legged frog	stream (large)	rock				x
Tailed frog	river, stream	mature & late seral forest				x
Southern torrent salamander	stream, seep, spring	late seral forest				x
Del Norte salamander	talus	closed canopy forest, late seral forest	x		x	
California slender salamander	down log	closed canopy conifer forest	x	x		
Red tree vole	mature & late seral conifer forest	young seral conifer forest	x			
White-footed vole	riparian, hardwood (alder)		x			x
Big brown bat	snag, cave, bridge (roost) riparian, early seral, forest opening (feed)	late seral forest	x	x	x	x
California myotis	snag, cave, bridge, rock, late seral, hardwood (roost) riparian, early seral, forest opening (feed)	late seral forest	x	x	x	x
Fringed myotis	snag, cave, rock, bridge (roost) riparian, early seral, forest opening (feed)	late seral forest	x	x	x	x
Hoary bat	snag, cave, mature & late seral forest (roost) riparian, forest, forest opening (feed)	late seral forest	x	x	x	x
Little brown myotis	snag, cave, rock, bridge, late seral (roost) riparian, early seral forest (feed)	late seral forest	x	x	x	x
Long-eared myotis	snag, cave, rock, late seral (roost) riparia, forest, forest opening (feed)		x	x	x	x
Long-legged myotis	snag, cave, rock, bridge, late seral (roost) riparian, forest (feed)	late seral forest	x	x	x	x
Silver-haired bat	snag, cave, rock, late seral (roost) shrub & open forest, forest opening (feed)	late seral forest, riparian	x	x	x	
Golden eagle	shrub, grass/forb (feed) late seral (repro, resting)	cliff, snag (resting)	x	x	x	
Peregrine falcon	cliff (repro) riparian/wetland (feed)	closed canopy forest (resting) all seral stages (feed)	x	x	x	x
Great gray owl	late-seral forest, forest (nest) early & late-seral forest, meadow, edge (feed)		x	x		
Sharptail snake	down log, talus	grass/forb, early seral	x	x	x	

What was the historical and what is the current relative abundance and distribution of species of concern in the analysis area ?

Historical (reference) Condition

No historic data exists on the distribution or relative abundance of wildlife species of concern in the analysis area. Wide-ranging species intolerant of frequent disturbance such as wolverine and grey wolf were likely present in the Klamath Province; although they have been extirpated in historic time. All the wildlife species of concern were almost certainly more abundant and widespread historically. Habitat loss and fragmentation, human disturbance and hunting/trapping, and competition or predation from exotic species have all contributed to population declines. While

many of these factors have been affecting populations for centuries, changes have been more pronounced in this century (since European settlement). Some species including Southern torrent salamanders, tailed frogs, peregrine falcons, golden eagle, northern spotted owls, white-footed voles, and red tree voles have probably experienced the most significant declines. Beaver were probably never common on BLM land in the analysis area because streams are generally too steep. The lower part of the North Fork Chetco River (on private land) contains some low-gradient reaches with potential for beaver.

Conversely, edge and disturbance-adapted species such as great horned owls, crows, ravens, and raccoons were probably less common than they are currently. Barred owls, opossums, and perhaps other species native to eastern U.S. have expanded their range or been introduced into the Klamath Province in historic time. Exotic species were not introduced until white settlers moved in during the mid-1800s.

Current Condition

Stream and Seep Associated Amphibians; Foothill yellow-legged frog, tailed frog, Southern torrent salamander - (refer to Section IV.3 Aquatic Species). Survey efforts for these species are limited to opportunistic surveys. No systematic inventories have been conducted. Foothill yellow-legged frogs occur in Ransom Creek, Bravo Creek, and N. Fork Chetco River. Habitat quality appears high (lot of rocks, pool habitats common). Tailed frogs occur in Ransom Creek, Mayfield Creek, and Bosley Creek and may occur in others.

Del Norte salamander - Del Norte salamanders are strongly associated with moist talus habitat (Nussbaum et. al. 1983). They feed on invertebrates near the surface during the wet, warm spring and fall periods, retreating deeper into the soil during other times of the year (L. Ollivier, pers. comm.). They must come to the surface to feed. Talus is especially common around rocky outcrops. Few surveys have been conducted although they are known to occur on BLM land along the N. Fork Chetco River, Ransom Creek, and in the Morton Butte area. High quality habitat is common in many areas of the analysis area and the salamanders are also likely widespread and common. Cursory surveys in the analysis area and in a similar area a few miles north suggest Del Norte salamanders are the most common upland salamander.

California Slender salamander - These salamanders are strongly associated with down logs, have a small range, and are generally restricted to the narrow coastal belt in southwest Oregon and northwest California. They often use rodent burrows to retreat underground during the dry season (range and life history information summarized in Blaustein et. al. 1995). Few surveys have been conducted, but they are known to occur in one location along Jim Ray Creek. Cursory surveys suggest these salamanders are present, but uncommon in the analysis area. The large down log habitat that these salamanders occur in seems scarce but may be more common in the southern half of the analysis area where soils and fire history facilitated development of large conifers and retention of down wood.

Voles - Red tree voles are arboreal rodents that occur in patchy distributions primarily in late-successional forests (Huff et al. 1992). Possible nest structures have been noted in 40-13-4 & 5, and 39-13-19. Using habitat definitions if the draft red tree vole protocol (BLM Instruction Memorandum No. OR-97-009, dated 4 Nov. 1996), approximately 35% of BLM land in the subwatershed is suitable habitat for red tree voles. Combining BLM data with Forest Service data

for the whole Chetco River system, at least 51% of federal lands meet suitable habitat definitions (assumed Forest Service land with mid and late-seral/climax stands meet habitat conditions). The proper scale for habitat analysis, according to draft protocol, is this 5th field/watershed level. The Siskiyou National Forest compiled a GIS analysis of habitat condition and found that all their watersheds were above habitat thresholds, even without counting habitat from the relatively small acreage of BLM land which occurs in some of the watersheds along their west edge (Lee Webb, pers. comm.); therefore, habitat conditions appear to be above the 40% habitat threshold identified in the protocol, and surveys prior to ground disturbing activities are not required.

The white-footed vole inhabits riparian areas, particularly along small streams with an alder forest component (Maser, et al. 1981). This rare vole has been documented in the district, but few surveys have been conducted. Their preferred habitat, alder riparian areas, occurs in the analysis area, particularly in areas recovering from landslides or debris torrents (see Sections III.5 Erosion Processes and IV.4 Riparian Habitat). Both species of vole are susceptible to habitat loss and fragmentation.

Bats - Bats are associated with a variety of habitat structures. Bats roost in buildings, bridges, rock crevices, tree cavities or foliage, and loose tree bark. Old growth forests provide higher quality roost sites than younger forests (Christy and West 1993). Foraging areas include the forest and forest openings, riparian areas, and open water. No surveys have been conducted for bats in the analysis area. Rocky outcrops and boulders for roosting are common in the analysis area; large conifers with deeply fissured and loose bark for roosting also occur along many streams. Only a few rocks bluffs have been casually surveyed for bat roosting habitat potential; suitable roosting crevices were noted in many of the rocks.

Golden Eagle - Golden eagles nest in large trees, snags, or cliffs and forage in meadow and shrub habitats. Golden Eagles are not common in the Coos Bay District. Only 1-2 nest sites are known. Foraging habitat is relatively scarce except in agricultural areas adjacent to BLM land. A pair of golden eagles has been seen on several occasions during the nesting season in recent years in the northern half of the analysis area suggesting that a pair may be nesting, although the exact location is unknown. Suitable nesting habitat exists on BLM land and foraging areas occur on the pastures and agricultural areas on nearby private land.

Peregrine Falcon - In 1988, biologists conducted an inventory of potential nest cliffs using aerial surveys. Cliffs with low to medium nesting potential (based on the availability of suitable nest platforms, cliff height, and proximity to water) are located at Cassidy Butte and on cliffs along Bravo Creek. Colegrove Butte received a medium to high nesting potential rating. Not all cliffs were inventoried. Several other high-potential nesting cliffs occur along the coastline only a short distance away (for a falcon). The BLM monitored the Bravo Creek cliff for nesting falcons in 1993 and 1994; no peregrines were detected. Peregrine falcons forage over riparian areas and a wide variety of other habitats including coastal habitats. The analysis area holds high potential for nesting and foraging falcons.

Great Gray Owl - Great gray owls generally nest in unlogged mature and late-successional conifer forests. They forage in meadows or other openings or in open forests [life history information summarized in the Great Gray Owl Survey Protocol (1995)]. Although they were thought to be a high elevation species found above 3000 feet, they have recently been found nesting

at 1700 feet on lands administered by Medford BLM. The analysis area contains 1290 acres above 2000 feet in elevation; although most of this is knobcone pine stands unsuitable for great gray owl habitat. They are not known nor suspected to occur in the District. Surveys last season on Siskiyou National Forest lands east of the analysis area did not turn up any great gray owls (Dave Austin, Siskiyou NF, pers. comm). Recent adjustments to the protocol recommend surveys be conducted on the Coos Bay District to determine whether or not great gray owls occur in the vicinity (BLM Info. Bulletin No. OR-97-311). Since meadows (potential foraging habitat) and late-successional forests (potential nesting habitat) are relatively common in the analysis area compared to other areas on the District, the analysis area may hold higher potential for great gray owl occupancy.

Sharptail Snake - Although no sharptail snakes have been found in the analysis area (no surveys ever conducted), these snakes could occur in a variety of conifer and hardwood forest, meadow, pasture, and brushland habitats. They are often found in moist areas near streams, under down logs or bark, or in talus (life history information summarized in Blaustein et. al. 1995). They are frequently found in association with talus or rocky outcrops and with conifer/hardwood/grassland edges (which are common in the analysis area).

How have management activities and natural processes changed the abundance, distribution, and movements of these species or the character of their habitats?

Del Norte salamander

Fires certainly affect Del Norte salamanders and their habitats, but the exact effects are probably highly variable depending on the timing and intensity of the fire. Natural fires occurred during the summer dry season when Del Norte salamanders are under ground, so the fires probably never directly killed many salamanders. Fire's primary effect was through its effect on canopy cover. Welsh and Lind (1995) found that high canopy cover was very important to Del Norte salamanders. Low intensity fires left patches of forest unburned. These unburned areas could have been refugia from where Del Norte salamanders could have repopulated adjacent areas after canopy cover increased post fire. Brush species can quickly reach 100% cover in less than 10 years. High densities of snags and dying trees left after a low intensity fire could have provided some marginal canopy cover allowing Del Norte salamanders to persist in areas after fires. Since large fire events probably removed canopy cover from many areas every 90-150 years or so (refer to Section III.7-Disturbance), Del Norte salamanders were probably always in a mode of recovery and recolonization of new or marginal habitats. Information as to the ability of Del Norte salamanders to survive and recolonize an area could possibly be found by conducting surveys in the Bosley Butte area. Species of concern in the analysis area were determined based on the above criteria and present knowledge of the range of each species. Table V-8 lists the species of concern that were identified for the analysis area, along with the reason for their inclusion. Table V-9 lists the habitat associations of the species of concern. where over 7000 acres burned intensely.

In contrast to natural fires, fire for site preparation on harvest units typically occurs during the moist spring and fall periods when Del Norte salamanders are active at the surface; hence, broadcast burning site preparation may kill many individuals. Timber harvest and road building also remove canopy cover and fragment habitat rendering it less suitable for the salamander.

California slender salamander

The frequent fires of the early 1900's and more recent timber harvest and salvage probably removed much of the natural down log habitat that California slender salamanders depend so heavily on. Harvest in the 1950's- 1970's sometimes consisted of high grading the large conifers from along creeks. These large conifers would have been the habitat for California slender salamanders today. The greater prevalence of large conifers in the southern half of the analysis area probably provided the best habitat for these salamanders historically, but this is also where most of the harvest has occurred (especially on private land).

Voles

Red tree voles occur most commonly in old-growth conifer forests and eat conifer needles exclusively (Carey 1991). In the analysis area, conifers often occur in linear strips along streams. Harvest often removed or at least broke these conifer corridors thereby removing and fragmenting the preferred habitat for red tree voles. Timber harvest reduced habitat quality and quantity for red tree voles (removed old-growth conifers and replaced them with young conifers or hardwood). Timber harvest has also fragmented habitat (reduced connectivity) by breaking linear patches of old-growth conifers along creeks.

Bats

Many of these bat species roost in bark fissures and loose bark which are most common on large Douglas-fir trees. Sixty one percent of the analysis area has been harvested thereby reducing availability of this roosting habitat. Many of the bat species also use rock cracks for roosting. The availability of rocky outcrops is not changing but the habitats around them are; therefore, the microclimates that they offer are changing too.

Golden Eagle

Even though timber harvest has removed nesting habitat for golden eagles (large trees and snags), nesting habitats for these mobile birds are still available in the northern half of the analysis area where the golden eagles have been seen. Management activities on adjacent private land (development and maintenance of pastures) has provided foraging areas for these eagles. Specific management activities such as timber harvest, prescribed burning, road construction, etc. could disrupt a year's reproductive effort if it occurs close enough to the golden eagle's nest by disturbing the nesting activities.

Peregrine Falcons

Foraging and nesting habitat conditions, while changed from historic conditions, probably have not been reduced. Specific management activities such as timber harvest, prescribed burning, road construction, etc. could disrupt a year's reproductive effort if it occurs close enough to a nesting cliff by disturbing the nesting activities.

Great Gray Owls

If great gray owls occur in the analysis area, tree planting and encroachment on meadows would have reduced foraging opportunities. Timber harvest and salvage reduced nesting opportunities.

Sharptail Snake

This snake's dependence on moist surface conditions under cover objects such as down logs, loose bark, and talus suggest that maintenance of shade (canopy cover) in streamside habitats (in Riparian Reserves) where microclimates favor cooler, moister conditions might be particularly important for sharptail snakes. Past harvest activities often focused on the large conifers available along streams suggesting habitat conditions for these snakes might be reduced. Sharptail snakes also use rocky outcrop areas as habitat, again suggesting that maintaining shade and cooler, moister microclimates around these structures is important.

What are the influences and relationships of species and their habitats with other ecosystem processes in the analysis area?

Del Norte salamander

Soils and geology exert a heavy influence on the abundance and distribution of Del Norte salamanders because of their direct influence on talus habitat. Fires, road building, timber harvest, and other ground disturbing activities can degrade habitat quality or destroy it and can also directly kill individuals (especially spring and fall burns).

California Slender salamander

Low-intensity fires can kill trees without drastically reducing canopy cover. These fire-killed trees will eventually provide down log habitat. (Refer to Section V.2, discussion on Snags and Down Logs). Timber harvest removes trees which would have eventually been down log habitat.

Voles

Fires, while destroying habitat, often left corridors of connected habitats along streams. These same fires, along with more productive soils, left more habitat in the southern half of the analysis area. (Refer to Section III.7-Disturbance).

Bats

Refer to Section V.2, discussion on Rocky Habitats, Snags and Down Logs.

Golden Eagle

Soils and geology determine the size, shape, and distribution of cliffs which are sometimes used by golden eagles for resting or nesting.

Peregrine Falcons

Soils and geology determine the size, shape, and distribution of cliffs which are used by peregrine falcons for nesting.

Sharptail Snake

Low-intensity fires can kill trees without drastically reducing canopy cover. These fire-killed trees will eventually provide down log habitat and loose bark used by sharptail snakes for cover (refer to Section V.2, discussion on Snags and Down Logs). Soils and geology determine the distribution and character of rocky habitats which are also commonly used by sharptail snakes.

What is the management objective (desired condition) for the wildlife species in the analysis area?

Maintain populations of species associated with early, mid, and late-seral conditions as well as species associated with various special habitats. Mid and late-seral species will primarily reside in the LSR and southern half of the analysis area and in Riparian Reserves. Species associated with cool or moist talus and rocky habitats will generally reside in the southern half of the analysis area. Early seral, meadow species (golden eagle, sharptail snake, great gray owl) will generally find habitat in the northern half of the analysis area; although mid and late seral forests should be available in Riparian Reserves and other Reserves in the northern area as well (for perches, down logs, snags, nesting areas).

V.4 PORT-ORFORD-CEDAR ROOT ROT

Phytophthora lateralis, Port-Orford-cedar root rot, was unintentionally introduced in the northwest as early as 1923 and has caused 100% mortality in some cases. The spores of the fungus, being highly mobile in water, travel downstream infecting previously uninfected areas. Spores also are transported by construction equipment, vehicles, human and animals.

What is the current distribution and level of infestation of Port-Orford-cedar root-rot in the analysis area?

Port-Orford-cedar (*Chamaecyparis lawsoniana*) (POC) is an exceedingly minor component of the forests within the analysis area. Riparian habitat surveys along Bravo, Ransom Creeks did not locate any POC adjacent to these streams. Similarly, a systematic survey of roads within the analysis area did not locate any POC. However, review of records from all the BLM timber sales sold since 1966 revealed that only 1 POC tree was cruised as part of the sales, and that particular sale was located on the western most edge of the analysis area.

The systematic road survey did locate nine locations of POC trees immediately outside of the analysis area. These sites were associated primarily with residential dwellings adjacent to county roads and three of these sites were suspected as being infected with the disease.

What is the potential for the continued introduction and spread of the disease?

The potential exists for humans, animals, equipment, and vehicles to transport infected soil into the analysis area. However, the opportunity for infection within the analysis area is extremely remote for the following several reasons; there is a lack of host trees, surveys have not found any POC adjacent to forest roads, and most access is restricted into the analysis area. Of possible concern is that a few infected sites are located along public roads and may serve as an potential source of infection to other areas outside the analysis area. However, once the single trees or small clumps die out they will no longer serve as a source of infection. The fungal spores survive only 4 - 7 years in the soil without a host tree to perpetuate itself (BLM 1994).

What ecological processes would be altered should POC be lost, or populations greatly reduced in the ecosystem?

Because POC is virtually absent from the analysis area , the loss of POC in not an issue.

What management actions (restoration, maintenance, protection, etc.) could be undertaken that would reduce the spread or help prevent the introduction of the disease into new areas?

Due to the lack of POC in the analysis area, no management actions to prevent infection are necessary.

V.5 NOXIOUS WEEDS

Noxious weeds and other exotic vegetation did not exist until after white settlement began in the area. Most exotic species were introduced into southern Oregon during the late-1800's to mid-1900's and have since spread from their source of introduction. Therefore, it may have taken many years for these species to reach this analysis area. Some of these species did not establish themselves until more areas were disturbed by human activities and propagules were transported in from infested areas.

Exotic species comprise approximately 20% of the analysis area flora (43 species). Most of these have been purposely introduced for various reasons and are associated with roads and disturbed areas. While most of the introduced vegetation does not persist over a period of time, some species, such as orchard grass (*Dactylis glomerata*), blackberry (*Rubus* sp.), and tall fescue (*Festuca arundinacea*) have the ability to spread and potentially displace native vegetation

What is the current status of the spread of noxious weeds in the analysis area?

Currently, noxious weeds are known throughout the analysis area, but at this time appear to generally occur as scattered populations primarily adjacent to roads in disturbed areas.

Gorse (*Ulex europaea*) has been documented adjacent to Road No 40-13-11.2 in the Palmer Butte area. A couple of plants were found next to utility poles installed to supply power to the communications site. The plants have been removed and the site is being monitored for re-occurrence. Two additional plants were located adjacent to Road No. 40-13-11.3 immediately to the east of the analysis area. These plants were pulled in 1997 and will be monitored for re-occurrence.

One large occurrence of Scotch broom (*Cytisus scoparius*) occurs on private lands at the southernmost entrance along South Coast's mainline 1000-line road outside of the analysis area. This may serve as a source point or the transport into the analysis area. However, vehicle access by other than company and BLM personnel is restricted and the potential rate of spread should be small.

Locations of tansy ragwort (*Senecio jacobaea*) and Klamath weed (*Hypericum perforatum*) are unknown, but populations generally consist of such low numbers that inventories have not been conducted. Also, these species are effectively controlled by biological agents and are deemed at levels where they do not pose any resource risks.

What is the ecological impact of noxious weeds?

Noxious weeds have the ability to out compete and possibly eliminate native vegetation by competing for water, sunlight, soil nutrients, and space. The two broom species and gorse have the ability of fix-nitrogen (i.e. able to take it out of the air) therefore they are able to establish on nutrient poor (disturbed) sites. This adaptation also gives these plants an advantage over native species. Indirectly, these species may impact wildlife species (if infestations become large) by creating less desirable forage and reducing habitat quality. Very few wildlife species appear to utilize these species.

Broom species and gorse have seeds which can remain dormant for many years (possibly up to 70-80 years, if under optimum conditions). Therefore, if areas are infested following logging, there is a likelihood that these species could eventually disappear (when canopy reaches closure) only to reestablish once the stand is logged in the future. This is more likely to occur in stands with shorter rotations (60-80 years), such as matrix and private lands.

Without any management, weed populations will increase in the future, primarily along road corridors. Besides the infestations within the analysis area, there is the possibility of spreading weeds into and from adjacent watersheds.

What is the potential of noxious weeds to spread and impact the analysis area?

The small size and scattered distribution of infected sites indicate that these areas are still treatable at the current time. However, of key concern is that these areas are on private lands and located along a main access road into the analysis area. A factor which may slow the rate of spread, is that access to a majority of the area is controlled by a private timber company, which does not allow the general public to drive onto their lands. This reduces the number of vehicles and lessens the

chances of introducing seeds.

Several gorse and scotch broom plants were recently discovered and pulled from BLM lands in the Palmer Butte area. The significance of this is that this area is located adjacent to the Gardiner Ridge County Road along the east boundary of the analysis area and has the potential to have seeds carried through this and adjacent watersheds. The Palmer Butte site is being monitored for recolonization.

It is likely that new weeds may become introduced (either unintentionally or intentionally) in this and other watersheds in the future.

What management actions (restoration, maintenance, protection, etc.) could be undertaken that would reduce the spread or help prevent the introduction of the disease into new areas?

The goal for noxious weed management is to contain noxious weeds populations so they do not pose a risk to resources. Currently, the level of infection lends itself to efficient control to remove these species from this analysis area, if action is undertaken promptly. The further introduction of non-native plant species should be kept at a minimum.